

hair is deeply serrate, but not at all feathery, short and without very long hairs except at the posterior end where there is quite a mass of long hair extending backward. The lateral hairy ridge notched by Dyar in *opella* is not conspicuous.

Structurally the head agrees with the other Arctiinae, but is decidedly more hairy than most. Epicrania quite hairy over the entire face, though less so, perhaps, than in *Ctenucha*. Front with punctures very far apart, with two or three secondaries, among which the primary is not recognizable. Adfrontals narrow and irregular, without secondaries, the puncture not very high. Clypeus normal, without secondaries. Labrum with ii somewhat higher than i, ia directly over ii but not very far from it. Lower lip normally proportioned for the Arctiidae, with very slender labial palpi; mentum and stipes with dense patches of secondary hair (7 to 10 hairs). The longer hair is serrate, most of the shorter hair smooth. The densely hairy labium separates it from the other arctiid caterpillars known to me.

Compared with specimens of *Lithosia*, *Hyphantria*, *Diacrisia*, *Estigmene*, *Isia*, *Apantesis*, *Euchætias*, *Halesidota* and *Ctenucha*.

The figure shows the front (*Fr*), adfrontals (*adf*), clypeus (*clyp*), and labrum seen from the front. The setae of the labrum are numbered.



## OBSERVATIONS ON MEMBRACIDÆ IN THE VICINITY OF ELIZABETH AND NEWARK, N. J.

BY IGNAZ MATAUSCH,

NEWARK, N. J.

### 1. *Ceresa diceros* Say.

The first specimen, a female, was found by me on July 9, and till August 13 I found both sexes constantly increasing in abundance but from that time on, singly, and mostly females. The last was collected September 12, south of Newark, N. J.

I found 32 eggs in one female collected August 4; 18 eggs in another collected August 6; and 15 in one collected August 13. On this account I venture to believe that the eggs are not deposited all at once but at intervals.

## 2. *Ceresa albescens* v. D.

July 9, I found a nymph resembling those of *C. taurina*, of yellowish-white fuzzy appearance, due to its being covered with thick hair. I was strongly inclined to believe that I had to deal with a (to me) new species of *Ceresa*, and therefore searched for other specimens in the same spot on *Viburnum*, and on July 13 I succeeded in finding three others. July 15, the first nymph developed to a splendid male, and I found one more of the nymphs. Then one more male and two females developed. I had killed the remaining nymph to make a drawing of it.

The color of the newly matured insect is a splendid green, and only by degrees does it change to the characteristic color associated with this species. I had been unable to get any trace of fully developed insects, in spite of diligent search, till, on September 12, I found a splendid female, south of Newark.

## 3. *Ceresa bubalus* Fabr.

This species was very plentiful; males from July 21 to August 1. On the latter date I collected the first female, and from that time on till September 12, both sexes were found, on which date out of 8 specimens, however, only one was male. Till September 30, I collected females only.

## 4. *Ceresa brevitylus* v. D.

Specimens of this species appeared at about the same time as the first males of *C. bubalus*, and seemed to be rare. I found only 4 specimens in spite of diligent search. Of these one was male, and two females. I could not determine the sex of the fourth specimen, as it was damaged in collecting. The first female was collected July 19, the second July 21, and two other specimens July 22, of which the one saved was a male. They resembled *C. bubalus* so closely that at first I thought them merely sports of that species with dark brown legs.

## 5. *Ceresa taurina* Fitch.

June 19 I collected the first nymph on a smooth species of *Solidago*, and later two more. The first did not develop, the two others however matured in 5 and 9 days respectively, into handsome males. Nevertheless they died two days afterwards. The adult insects col-

lected from July 6 to 16 were all males. On the latter date I found the first female, and then both sexes occurred till the twenty-second, when the females became more numerous. September 6, I still took them in rather large numbers, but after that time they occurred less and less frequently. Among 27 *Cercsa* specimens collected on September 19, in the region south of Newark, I did not find a single *taurina*.

#### 6. *Cercsa palmeri* v. D.

June 27 I found nymphs of this species quite numerous on *Liquidambar*. These became still more frequent until July 7, when I collected the first mature insect. (There were only males up to June 16.) By July 19 the females were more abundant by far, and I collected varying numbers of both sexes. I also found nymphs as late as July 25. One was also collected by Dr. Lutz, August 2, in the Bronx, New York City, and I took 6 females on the same day. I examined these for eggs but found them all empty. From then till September 19, only females were taken.

#### 7. *Cercsa borealis* Fairm.

The first were found July 21 and 22—6 females and 5 males. August 1 I found 2 more males and 3 females. They were very plentiful from September 6 to 19, when the last lot—all females—were collected.

#### 8. *Stictocephala lutea* Walk.

I found these to be plentiful as early as June 13 on a smooth species of *Solidago*. I collected several, and also looked for nymphs and nymph-moult. I observed but one specimen, however, likely to have been the nymph of *lutea*. It was perched by the side of an adult insect, but on my approach, both dropped into the grass and escaped, so I obtained only a fleeting glance of it. This nymph was grayish-blue in color with two long, spreading, anal projections which however are present in all nymphs, but are shorter. The adult insect is usually found under the crown of the plant, rarely within it. When approached it has the habit of trying to hide by darting to the side of the stem opposite the observer. I have noticed the same habit in some beetles and young grasshoppers. June 13 I found both sexes in equal numbers, but took males only between this date and the twenty-seventh. On the latter date, however, I found

3 females, one of which I kept alive until July 2, but as a rule they died within 2 or 3 days. I collected all the material alive, so as to get the eggs, and to watch the mating of the sexes if possible. I was disappointed in the latter, but eggs were obtained from several females. I observed that they deposited the eggs on the lower part of the stem, either singly or in groups of 2 or 3. These were imbedded for about half their length in crevices of the bark. The eggs are about 1 mm. long, somewhat bent, the lower half somewhat more acutely so, than the upper portion, which is furnished with a rough skin-like cap ending in a point on the convex side, and so placed that it more or less completely fills out the crevice of the bark, thus protecting the egg. On examining a lot of females for eggs, I was surprised to find only 6 in each specimen, except in one which had 5. It is hardly probable that this represents the full number of eggs, for it is very likely that they are laid as I suspected in the case of *Ceresa diceros*. I could not determine from the specimens in captivity the entire number of eggs deposited by one female, and so I have reserved this question for further observation.

9. *Acutalis semicrema* Say.

The first insects of this species were found July 19, under *Sambucus* on *Solidago*, both sexes in equal numbers. July 22 I collected 2 nymphs, which at first sight seemed to be about half-grown *Ceresa palmeri*. But the pronotum does not rise vertically above the head as in that species, but is rounded off. It differs also in the closely appressed dorsal projections of its segments, which are totally lacking in the full-grown nymph of *C. palmeri*. One of these nymphs developed into an adult female the following morning, but I had to kill the other to make a drawing. The last examples of this species were collected by me as August 1. At this time the females were the more numerous. Mr. E. A. Bischoff also collected 3 females August 12, at Irvington, N. J.

10. *Micrutalis calva* Say.

September 26 I collected one female of this species at Irvington, N. J., on a *Robinia* bush, growing in a patch of *Solidago*.

11. *Carynota mera* Say.

June 20 I found the first nymph on *Juglans*. The next morning it moulted, but died shortly afterwards. July 3 I found the first

mature female and more nymphs. July 4 and 5 I found one female on each day, and on the sixth I collected many, both females and nymphs. I succeeded in bringing five of the nymphs to maturity, and all turned out to be females. One female adult when collected was examined for eggs, but there were none. From that time I collected females singly till July 19. Three of these I examined for eggs, but found none. September 19 I collected the last insect of this species at Newark, N. J. All were females. The only male obtained this season was collected by Mr. R. P. Dow, at Flatbush, L. I.

12. *Thelia bimaculata* Fabr.

August 1 Mr. Bischoff collected five specimens at Rahway, N. J., among them one with retarded development of the sexual organs, and intermediate between the male and female in size. A slight variation of form and color in the prothorax of this specimen indicates that the incomplete development of the sexual organs may also affect other parts of the body. Mr. Bischoff also found some nymphs but did not keep them. I found several adults and nymphs, September 8, at Cold Spring Harbor, L. I.

13. *Telamona* species? (near *heliria*).

This insect was found on *Liquidambar*, as was the case with two specimens collected last year in the Bronx, N. Y. City. July 6 I took one male, and July 13 one female. July 24 I collected one female and three males, and the next day another male. Besides these, on July 24 I found two nymphs, one of which, from its form, size and the locality could possibly be the nymph of this species. However, I did not succeed in bringing it to maturity, in spite of all my efforts. I noticed that it would not nourish itself from the young shoot where I placed it but insisted on trying to feed at its junction with the old last year's shoot, where the sap was richer and most plentiful.

14. *Telamona* species?

Small, not yet identified specimens were found as follows: July 5-8 on *Liquidambar*. Of these three were females and one a male. The other four were sexually undeveloped. July 15 I had twenty-two specimens in all, eleven of them sexually abnormal. From that time on, single captures of males and females were made, until July 25, when the last was taken. During this period, however, I collected

some nymphs which were perhaps of the same species. Nevertheless, I could not be sure, for in spite of all my care I could not raise any to maturity, as they required food for a longer time than it could be obtained in abundance.

15. *Telamona ampelopsidis* Harris.

Altogether I found five specimens of this species on *Ampelopsis*, July 3 to 15. Of these one was male, two were females, one had imperfectly developed genitalia, while the other seemed to be in the same condition but was damaged and I could not make sure.

16. *Telamona* species? (labeled "near *reclivata*" by Mr. Van Duzee).

I found one female, September 6 on *Quercus*, and another September 19. Both were darker in color, but otherwise corresponded with this species.

17. *Cyrtolobus* species?

July 3 to 5 I found eight females on *Quercus alba*. I examined one for eggs, and found eight. Because of this small number, and because I found no males, I concluded that it was rather late in the season for this insect.

18. *Ophiderma flavocephala* Gody.

August 1 Mr. Bischoff collected one specimen at Rahway, N. J., and also one identified as *O. obscura* by Van Duzee. The latter species is not mentioned in his "Studies on North American Membracidae," but was probably described later.

19. *Vanduzia arcuata* Say.

Mr. Bischoff collected one male and two females at Rahway, N. J., and September 8 I found a number of them at Cold Spring Harbor, L. I., with *Thelia bimaculata*. They were on *Robinia* but escaped. At Elizabeth and Neward I found none.

20. *Publilia concava* Say.

This insect was not found here, in spite of the variety of species of *Salidago* which occur. Mr. W. Reiff, however, on September 27 collected a great number of adults of both sexes and some nymphs at Forest Hills, Boston, Mass., and was kind enough to send them to me.



**21. Campylenchia curvata Fabr.**

June 13 I found a small number of nymphs on *Solidago*. The first adult developed on the twenty-fifth, after having moulted at least twice. This seems clear, as it had apparently moulted at least once before capture as I judged from the number of moulted skins. After obtaining these specimens, I observed only nymphs singly and now and then. The first adult insect (a male) was caught June 26. The next day I obtained a male and female, and after that both sexes in varying numbers till August 1, when the proportion of females had noticeably increased. September 19 I took two females near Newark, and September 26 Mr. Bischoff obtained another at Irvington, N. J.

**22. Euchenopa binotata Say.**

July 3 the first specimens were taken. This species was, as a rule, very scarce, only single specimens being taken, except on July 6, when I found a *Viburnum* tree with a large number of both sexes and also many nymph-moult. Among the specimens was one freshly matured insect. After this the species was rarely found until September 19, when I obtained my last specimen (a female) at Newark. In August I received a number of insects, mostly females, of remarkable size and shape, and some still living, from the Field Museum of Natural History, Chicago, through the kindness of Dr. B. E. Dahlgren. With them were some very fine specimens of twigs covered with eggs.

**23. Microcentrus caryæ Fitch.**

I found only one specimen, a female and without horns, on *Juglans* at Newark, September 19. Mr. Bischoff, however, has given me six splendid specimens of this species collected by him at Lakehurst, N. J. Four of these were horned females and two were males. The shape of the horns on the latter is so much like that in *Centruchoidea perdita* Am. & Serv. that I am beginning to doubt whether *C. perdita* and *M. caryæ* may not be merely local variations. This, however, cannot be exactly determined until more extensive studies are made, under favorable conditions. Mr. R. P. Dow also collected one male similar to the above at Pinelawn, L. I., in June of this year.

*Microcentrus caryæ* appears in a great variety of forms and size according to my observations of last year. The first insects of that genus which I received were collected by Mr. W. T. Davis and Mr. E. A. Bischoff in Lakehurst, N. J. They were all females and had

rather strongly developed horns. Later Mr. Davis collected one male of the same form. Another lot of both sexes (two males, three females) was received from Mr. Davis from the same locality, smaller in size and with less developed prothoracic horns. I collected three specimens on Staten Island with still less developed prothorax and a similar lot in Queens, L. I., on swamp oak and walnut, all males. At Lake Hopatcong, N. J., I found fourteen on a walnut having the horns only slightly indicated. Both sexes were represented. One, however, from the same tree had rather strongly developed horns. Finally I got one female from Hempstead, L. I., collected by Mr. Ch. Olsen, with highly developed, wide ear-like horns, showing how extreme the variations may be. In size they vary from 6.5 to 9.5 mm.

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## SMILIA CAMELUS FABRICIUS AND SOME OF ITS VARIATIONS.

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Through the kind assistance of some of my fellow entomologists I have been able to make observations on the variations of *Smilia camelus* females. The males seem to be more constant, but the females vary somewhat in size, and to a remarkable extent in coloration and markings.

Without doubt, as Mr. Van Duzee says, *guttata* Fitch and *viridis* Goding are only varieties of *camelus*, and I think only of the females. The first insects I received from Mr. G. P. Engelhardt and M. W. Beutenmüller, and one from Florida, were typical *camelus* females. Mr. F. E. Watson collected on June 25, 1907, in New Foundland, N. Y., two females of *guttata* having the transverse band formed by a row of more or less heavy markings but otherwise they are the same in color and form as *camelus*. Professor Filippo Silvestri collected, besides two males, one female intermediate in size between male and female of the dark form of the male. At the meeting of the New York Entomological Society on November 17, 1908, I exhibited them